TOWN OF EAGAR
SOUTH BURK STREET
WATER LINE REPLACEMENT

1801 WEST DEUCE OF CLUBS, SUITE 230
SHOW LOW, ARIZONA 85901
PHONE: 928.537.7218 FAX: 928.537.8422
www.tetratech.com

TETRA TECH

NOTES & SPECIFICATIONS

WATER

1. All construction methods and materials shall conform to the requirements of the Town of Eagar Standards and/or MAG Standards and Details for Public Works Construction, latest edition.
2. All frames, covers, valve boxes and water meter boxes shall be adjusted to finish grade by the Contractor per Town Specifications.
3. PR-200, DR-21, Per ASTM D-2241, PVC Water Pipe shall be used for water distribution lines.
4. A minimum cover of four (4) feet to finished grade shall be maintained over all water lines, with five (5) foot bury for fire hydrants.
5. All fittings in water distribution lines shall be installed with thrust blocks per MAG Standard Detail 380 or MEGA LUGS. All gate valves shall be installed with concrete blocking per MAG Standard Detail 301.
6. Fire hydrants shall be installed per MAG Standard Detail 360.
7. All PVC pipe must be NSF approved for potable water use.
8. Disinfection of all water lines shall be in accordance with AWWA Specification C-651-92, ADHS Engineering Bulletin No. 8 and the Project Specifications.
9. Water line shall be pressure tested in accordance with the requirements of AWWA C-605. Test Pressure shall be 150 psi for two (2) hrs.
10. Utility marking tape shall be installed over all water mains. It shall be marked "CAUTION - WATER LINE BELOW" and shall be located at least 12" above the pipe. Tape shall be at least three (3) inches wide. A tracer wire shall be installed in the trench and shall surface at all boxes.
11. It is the Contractor's responsibility to insure a minimum cover of three (3) feet for all service stubs and fire hydrant lines crossing drainage ditches.
12. A.A.C. R18-4-502 DESIGN: MINIMUM DESIGN CRITERIA
    - 12.A. A public water system shall be designed using good engineering practices. A public water system which is designed in a manner consistent with the criteria contained in Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems," issued by the Arizona Department of Health Services, May 1978 (and no future editions), which is incorporated herein by reference and on file with the Office of the Secretary of State, shall be considered to have been designed using good engineering practices. Other system designs shall be approved if the applicant can demonstrate that the system will function properly and may be operated reliably in compliance with this Chapter. Minimum design criteria which are not subject to modification are listed in this Section.
    - 12.B. A potable water distribution system shall be designed to maintain and shall maintain a pressure of at least 20 pounds per square inch at ground level at all points in the distribution system under all conditions of flow.
    - 12.C. Water and sewer mains shall be separated in order to protect public water systems from possible contamination. All distances are measured perpendicularly from the outside of the sewer main to the outside of the water main. Separation requirements are as follows:
      - 12.C.1. A water main shall not be placed:
        - 12.C.1.a. Within six (6) feet, horizontal distance, and below two (2) feet, vertical distance, above the top of a sewer main unless extra protection is provided. Extra protection shall consist of constructing the sewer main with mechanical joint ductile iron pipe or with slip-joint ductile iron pipe if joint restraint is provided. Alternate extra protection shall consist of encasing both the water and sewer mains in at least six (6) inches of concrete for at least ten (10) feet beyond the area covered by this subsection (C)(1)(a).
        - 12.C.1.b. Within two (2) feet horizontally and two feet below the sewer main.
      - 12.C.2. No water pipe shall pass through or come into contact with any part of a sewer manhole. The minimum horizontal separation between water mains and manholes shall be six (6) feet, measured from the center of the manhole.
      - 12.C.3. The minimum separation between force mains or pressure sewers and water mains shall be two (2) feet vertically and six (6) feet horizontally under all conditions. Where a sewer force main crosses above or less than six (6) feet below a water line, the sewer main shall be encased in at least six (6) inches of concrete or constructed using mechanical joint ductile iron pipe for ten (10) feet on either side of the water main.
      - 12.C.4. The separation requirements do not apply to building, plumbing, or individual house service connections.
      - 12.C.5. Sewer mains (gravity, pressure, and force) shall be kept a minimum of 50 feet from wells unless the following conditions are met:
        - 12.C.5.a. Water main pipe, pressure tested in place to 50 psi without excessive leakage, is used for gravity sewers at distances greater than 20 feet from water wells;or
        - 12.C.5.b. Water main pipe, pressure tested in place to 150 psi without excessive leakage, is used for pressure sewers and force mains at distances greater than 20 feet from water wells. "Excessive leakage" means any amount of leakage which is greater than that permitted under the AWWA Standard applicable to the particular pipe material or valve type.
      - 12.C.6. Requests for authorization to use alternate construction techniques, materials, and joints shall be reviewed by the Department, and such requests may be approved on a case-by-case basis.
    - 12.D. A water system shall not construct or add to its system a well which is located:
      - 12.D.1. Within 50 feet from existing sewers unless the sewer main has been constructed in accordance with Subsection (C)(5)(a) or (b), of this Section;
      - 12.D.2. Within 100 feet of any existing septic tank or subsurface disposal system;
      - 12.D.3. Within 100 feet of a discharge or activity which is required to obtain an Individual Aquifer Protection Permit, pursuant to A.R.S. s.s. 49-241(A) through 49-251;
      - 12.D.4. Within 100 feet of an underground storage tank as defined in A.R.S. s.s. 49-1001(17);
      - 12.D.5. Within 100 feet of hazardous waste facilities operated by large quantity generators and treatment, storage, and disposal facilities regulated under the Arizona Hazardous Waste Management Act, A.R.S. s.s. 49-921 et seq.
    - 12.E. Construction materials used in a public water system, including residential and nonresidential facilities connected to the public water system, shall comply with NSF Standard 61 and shall be lead free as defined at AAC R18-5-504 and R18-1-101 and according to paragraphs (1) and (2) below. This section shall not apply to leaded joints necessary for the repair of cast iron pipes.
      - 12.E.1. When used with respect to solders and flux, "lead free" means containing no more than 0.2 percent (.2%) lead.
      - 12.E.2. When used with respect to pipes, "lead free" includes pipes and pipe fittings containing no more than 8.0 percent (8%) lead.
13. Water line to be installed with depth of 48" from top of pipe to bottom of corrugated metal pipe at the drainage crossings.

GENERAL

1. Contractor shall be responsible for obtaining any and all necessary permits required by Town, County, or State agencies.
2. All applicable local, State and National safety codes and requirements shall be observed at all times during the construction.
3. It shall be the responsibility of the Contractor to locate all underground utilities in advance of construction and observe all possible precautions to avoid any damage to such. The Engineer does not warrant the locations of underground utilities either as shown on or omitted from these drawings.
4. Any question raised relative to the accuracy of improvement installation shall not be raised subsequent to completion of the work unless all survey stakes are maintained intact. Should such stakes not be present and verified as to their origin, no claim for additional compensation for correction shall be presented to any party and such shall be corrected by the Contractor at his expense.
5. It shall be the Contractor's responsibility to properly dispose of all waste or excess materials, including, but not limited to, excess spoil, bedding, piping, concrete, etc.
6. A complete set of AS-BUILT drawings on Compact Disc and ADEQ approval of construction shall be submitted to the Town of Eagar prior to acceptance of this project.
7. All work performed within ADOT Right of Way shall be performed in strict accordance with an ADOT Encroachment Permit.
8. Contractor shall replace in kind, any asphalt that is damaged during construction.
9. Contractor shall replace in kind, any fence that is damaged during construction.

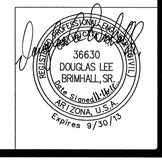
TRAFFIC CONTROL

1. The Contractor shall be responsible for providing traffic control devices, warning signs and necessary personnel, as outlined in the Contract Documents and Specifications, to protect the general public from hazards created by construction work. NO detours or road closings shall take place without prior approval of Eagar Officials. Requests for detours or road closings shall be made at least two (2) days in advance of construction.

LEGEND

	WATER TEE (SIZE ON PLANS)
	WATER CROSS (SIZE ON PLANS)
	REDUCER
	WATER VALVE (SIZE ON PLANS)
	NEW FIRE HYDRANT
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
WELL	EXISTING WELL
	NEW 8" WATER LINE
1"W	EXISTING 1" WATER LINE
2"W	EXISTING 2" WATER LINE
6"W	EXISTING 6" WATER LINE
8"W	EXISTING 8" WATER LINE
4"SS	EXISTING 4" SEWER LINE
6"SS	EXISTING 6" SEWER LINE
8"SS	EXISTING 8" SEWER LINE

SHEET INDEX



PROJECT LOCATION:
SOUTH BURK STREET
EAGAR, ARIZONA

CLIENT INFORMATION:
TOWN OF EAGAR
22 WEST 2ND STREET
EAGAR, ARIZONA 85925

Tt PROJECT No.:
133-24696-11001

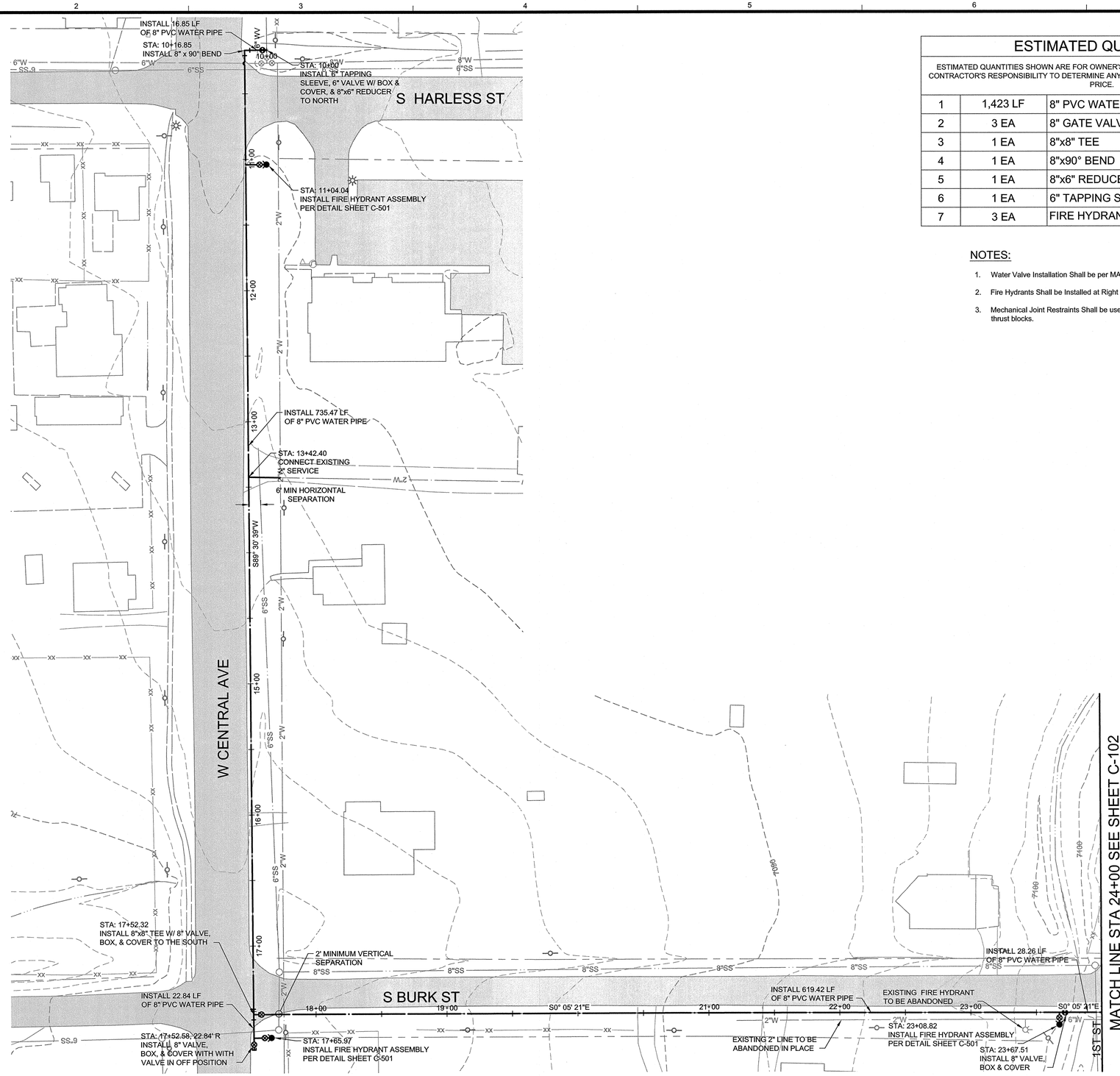
CLIENT PROJECT No.:

PROJECT DESCRIPTION / NOTES:

ISSUED:

VICINITY MAP:

SOUTH BURK STREET WATER LINE REPLACEMENT



ESTIMATED QUANTITIES

ESTIMATED QUANTITIES SHOWN ARE FOR OWNER'S CONVENIENCE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ANY QUANTITIES WHICH MAY AFFECT THE BID PRICE.

1	1,423 LF	8" PVC WATER PIPE
2	3 EA	8" GATE VALVE w/ BOX & COVER
3	1 EA	8"x8" TEE
4	1 EA	8"x90° BEND
5	1 EA	8"x6" REDUCER
6	1 EA	6" TAPPING SLEEVE w/ VALVE
7	3 EA	FIRE HYDRANT ASSEMBLY (COMPLETE)

NOTES:

1. Water Valve Installation Shall be per MAG Std Dtl 340 & 391-1
2. Fire Hydrants Shall be Installed at Right of Way Line & per MAG Std Dtl 360
3. Mechanical Joint Restraints Shall be used at all fittings in lieu of concrete thrust blocks.

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SHOW LOW, ARIZONA 85901
PHONE: 928.537.7218 FAX: 928.537.8422

REGISTERED PROFESSIONAL ENGINEER
36630
DOUGLAS LEE BRIMHALL, SR.
CIVIL
ARIZONA, U.S.A.
Expires 9/30/13

MARK	DATE	DESCRIPTION	BY

TOWN OF EAGAR
SOUTH BURK STREET, EAGAR, ARIZONA
WATER LINE REPLACEMENT PLAN
FOR
SOUTH BURK STREET
WATER LINE IMPROVEMENT

Project No.:	133-24696-11001
Designed By:	DLB
Drawn By:	RWP
Checked By:	DLB

C-101

Bar Measures 1 inch

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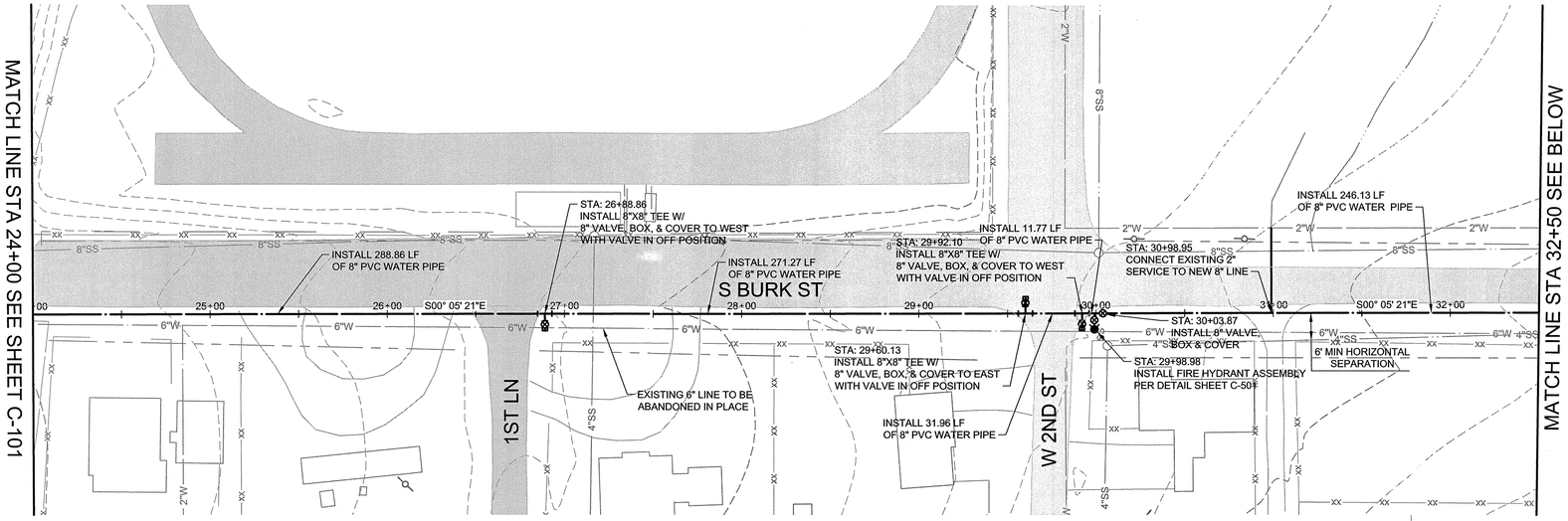
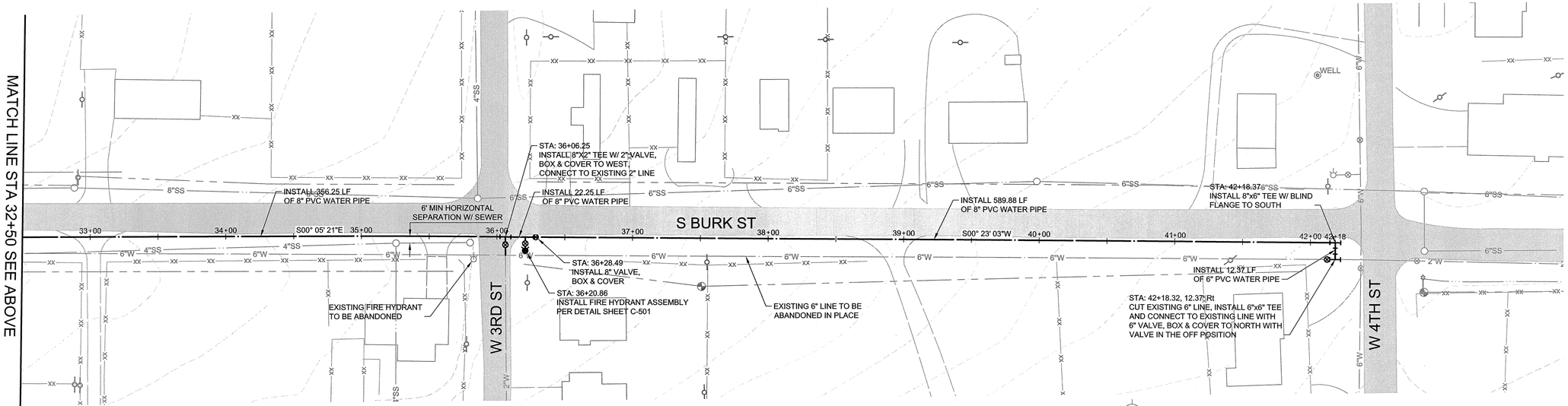


0 20' 40' 80'

SCALE: 1" = 40'



0 20' 40' 79.9999'

SCALE: 1" = 40'

ESTIMATED QUANTITIES

ESTIMATED QUANTITIES SHOWN ARE FOR OWNER'S CONVENIENCE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ANY QUANTITIES WHICH MAY AFFECT THE BID PRICE.

1	1,818 LF	8" PVC WATER PIPE
2	5 EA	8" GATE VALVE w/ BOX & COVER
3	3 EA	8"x8" TEE
4	1 EA	8"x2" TEE
5	1 EA	8"x6" TEE
6	1 EA	6"x6" TEE
7	1 EA	6" GATE VALVE w/ BOX & COVER
8	12 LF	6" PVC WATER PIPE
9	1 EA	2" GATE VALVE w/ BOX & COVER
10	2 EA	FIRE HYDRANT ASSEMBLY (COMPLETE)

NOTES:

1. Water Valve Installation Shall be per MAG Std Dtl 340 & 391-1
2. Mechanical Joint Restraints Shall be used at all fittings in lieu of concrete thrust blocks.

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REGISTERED LAND SURVEYOR
36630
DOUGLAS LEE
BRIMHALL, SR.
Douglas Lee Brimhall
ARIZONA, U.S.A.
Expires 9/30/13

MARK	DATE	DESCRIPTION	BY

TOWN OF EAGAR,
SOUTH BURK STREET, EAGAR, ARIZONA
WATER LINE REPLACEMENT PLAN
FOR
SOUTH BURK STREET WATER LINE IMPROVEMENT

Project No.:	133-24696-11001
Designed By:	DLB
Drawn By:	RWP
Checked By:	DLB

C-102

Bar Measures 1 inch

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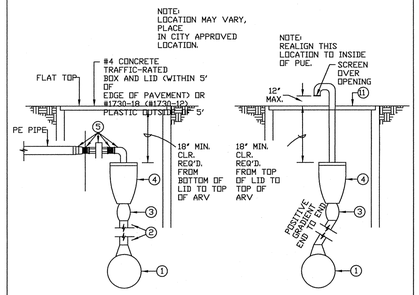
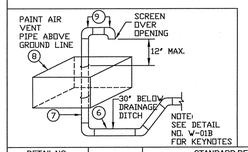


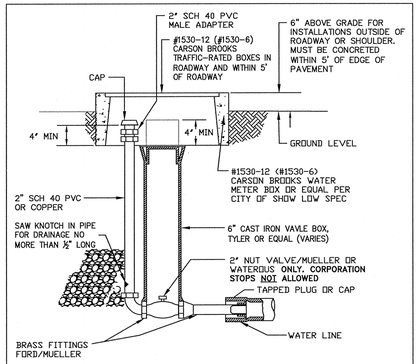


DETAIL NO.		STANDARD DETAIL
W-01A		WATER LINE AIR RELEASE DETAIL
SHEET 1 OF 2		

NOTES:

1. FORD/MUELLER TAP SADDLE.
2. BRASS OR COPPER PIPE.
3. FORD/MUELLER CORPORATION STOP.
4. CRISPIN AIR-RELEASE VALVE, OR EQUAL.
5. A. MALE PEP PIPE ADAPTER.
   B. 2" NIPPLES, GALVANIZED OR BRASS.
   C. UNION, GALVANIZED OR BRASS.
   D. STREET 90 ELL, GALVANIZED OR BRASS.
6. GALVANIZED, BRASS COPPER PIPE, OR POLY.
7. RISER (GALVANIZED, BRASS OR COPPER) PIPE.
8. #1530-12 (#1530-6) CARSON/BROOKS METER BOX WITH LID AND 1" HOLE DRILLED IN THE CENTER FOR RISER. PLACE IN CITY APPROVED LOCATION.
9. 2-90° ELL'S WITH FINE MESH SCREEN OVER OPENING.
10. PVC NOT APPROVED FOR ANY NON-BURIED INSTALLATION.
11. 1730-18 (#1730-12) CARSON/BROOKS METER BOX WITH LID AND 1" HOLE DRILLED IN THE CENTER FOR RISER. PLACE IN CITY APPROVED LOCATION.

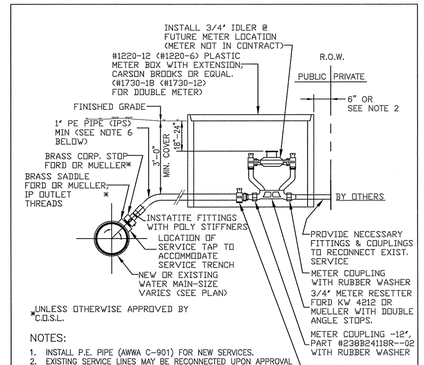
DETAIL NO.		STANDARD DETAIL
W-01B		WATER LINE AIR RELEASE DETAIL
SHEET 2 OF 2		



NOTE:

1. GRAVEL OR CINDERS, MEGA LUGS ARE REQUIRED. LENGTH OF RESTRAINT TO BE DETERMINED BY DESIGN ENGINEER.

DETAIL NO.		STANDARD DETAIL
W-02		WATER LINE BLOW OFF DETAIL
SHEET 1 OF 1		

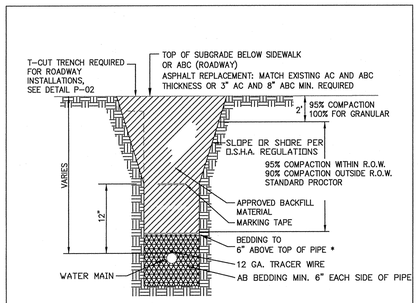


*UNLESS OTHERWISE APPROVED BY C.O.S.L.

NOTES:

1. INSTALL P.E. PIPE (AWWA C-901) FOR NEW SERVICES.
2. EXISTING SERVICE LINES MAY BE RECONNECTED UPON APPROVAL BY THE CITY. MODIFY CORP. STOP AND COUPLINGS ACCORDINGLY.
3. USE OF COUPLING TO CONNECT NEW SERVICE CONNECTION TO EXISTING SERVICE LINE ONLY BY APPROVAL BY THE CITY.
4. ALL FITTINGS FROM THE CITY WATER MAIN TO INSIDE THE METER BOX SHALL BE BRASS. NO GALVANIZED FITTINGS SHALL BE USED.
5. COUPLINGS SHALL BE MUELLER AND FORD COMPRESSION TYPE WITH POLY STIFFENERS.
6. WATER METERS AND SERVICE LINES FROM THE METER TO THE RESIDENCE SHALL BE SIZED PER THE CURRENT ADOPTED VERSION OF THE UNIFORM PLUMBING CODE BY DESIGN ENGINEER.
7. COPPER WASHERS ARE NOT ALLOWED. USE RUBBER WASHERS ONLY.

DETAIL NO.		STANDARD DETAIL
W-03		WATER SERVICE DETAIL
SHEET 1 OF 1		



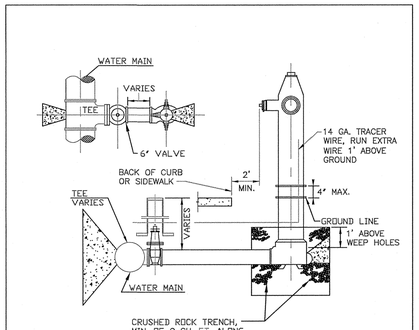
*BEDDING MATERIAL APPROVED BY ENGINEER AND COMPACTED TO 95% MIN.

NOTES:

1. A SLURRY MIX (1 SACK) WILL BE ALLOWED AS BACKFILL IN THE TRENCH. INSTALL MARKING TAPE ON TOP OF PIPE BEDDING, WHEN USING SLURRY. IF WATER MAIN IS IN ADOT ROW, SLURRY MIX SHALL MEET ADOT SPECIFICATIONS.
2. RESTRAINT LENGTH MAY INCREASE WITH ALTERNATE BEDDING MATERIAL. CALCULATIONS ARE REQUIRED.

BACKFILL PER CITY SPEC.
BEDDING MATERIAL
UNDISTURBED EARTH

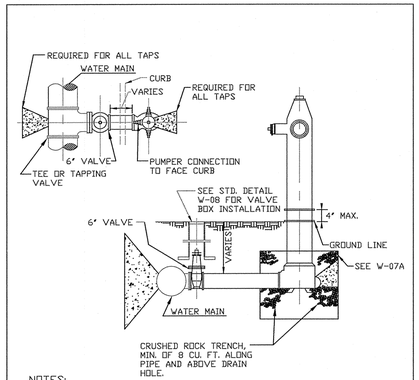
DETAIL NO.		STANDARD DETAIL
W-06		WATER MAIN TRENCH DETAIL
SHEET 1 OF 1		



NOTES:

1. ALL JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE RESTRAINED MECHANICAL TYPE.
2. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
3. SEE STANDARD DETAIL W-07C FOR LOCATION OF HYDRANT.
4. WATEROUS OR MUELLER HYDRANTS ONLY.
5. DO NOT INSTALL HYDRANTS IN ROADSIDE DITCHES.
6. IN CASES WHERE A HYDRANT IS ADDED TO AN EXISTING MAIN OR WHERE A TAPPING VALVE IS USED, CONCRETE THRUST BLOCKS MUST BE INSTALLED BEHIND TEE. MAG ST.DETAIL 340.
7. F.H. EXTENSION MAY BE USED TO ADJUST TO PROPER GRADE.

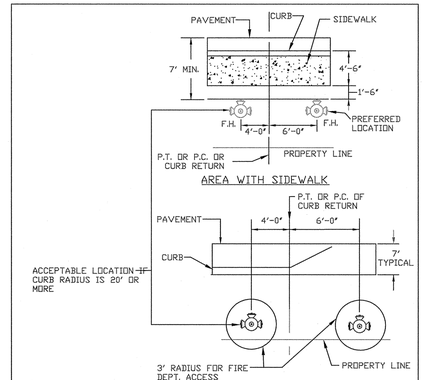
DETAIL NO.		STANDARD DETAIL
W-07A		FIRE HYDRANT INSTALLATION
SHEET 1 OF 3		



NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN MAY BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE MECHANICAL JOINT RESTRAINT TYPE.
2. FOR CONCRETE THRUST BLOCKS, SEE STD. DETAIL W-10.
3. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
4. SEE STD. DETAIL W-07C FOR LOCATION OF HYDRANT.
5. F.H. EXTENSION MAY BE USED TO ADJUST TO PROPER GRADE.
6. IF CONCRETE IS USED, DRAIN HOLES MUST REMAIN OPEN.

DETAIL NO.		STANDARD DETAIL
W-07B		FIRE HYDRANT INSTALLATION DETAIL
SHEET 2 OF 3		



PARKWAY AREA OR NO SIDEWALK

NOTES:

1. NO OBSTRUCTIONS SUCH AS UTILITY POLES, STREET SIGNS, IRRIGATION BOXES, FENCES, ETC., MAY BE PLACED BETWEEN CURB AND HYDRANT.
2. ON LOCATIONS IN MID BLOCK, THE FIRE HYDRANT WILL BE ALIGNED WITH A PROPERTY LINE.
3. DO NOT INSTALL HYDRANT IN ROADWAY DITCH.
4. IF HYDRANT LIES IN DITCH BACK SLOPE, EXCAVATE AND BENCH TO MIN. RADIUS FOR ACCESS.

DETAIL NO.		STANDARD DETAIL
W-07C		FIRE HYDRANT INSTALLATION DETAIL
SHEET 3 OF 3		

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PHONE: 928.537.7218 FAX: 928.537.8422

REGISTERED PROFESSIONAL ENGINEER
36630
DOUGLAS LEE BRIMHALL, SR.
Date signed 11/14/13
ARIZONA, U.S.A.
Expires 9/30/15

MARK	DATE	DESCRIPTION	BY

TOWN OF EAGAR
SOUTH BURK STREET, EAGAR, ARIZONA
WATER LINE REPLACEMENT PLAN FOR
SOUTH BURK STREET WATER LINE REPLACEMENT

Project No.:	133-24696-11001
Designed By:	DLB
Drawn By:	RWP
Checked By:	DLB

C-501

Bar Measures 1 inch

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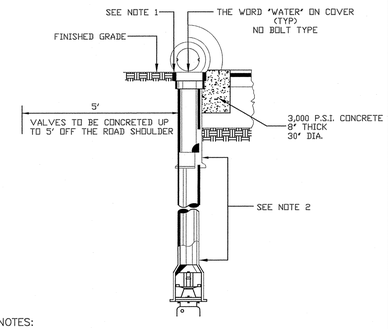


NOTES:

1. VALVE BOX SHALL BE ADJUSTED TO THE FINAL FINISHED GRADE AFTER PLACEMENT OF THE ASPHALTIC CONCRETE, ABC, OR CONCRETE SURFACE.
2. USE PARKSON TYLER, APCO, OR EQUAL DEEP SKIRTED LID (4" OR MORE) TYPE, SLIDING ADJUSTABLE CAST IRON VALVE BOX. C.I. MIN. T.S. 30,000 P.S.I. DOMESTIC
3. VALVES THAT ARE DEEPER THAN 5' MUST HAVE A FIBERGLASS EXTENSION.
4. CONCRETE COLLARS REQUIRED WITHIN ALL ROADWAY RIGHT OF WAYS AND EASEMENTS UP TO 5' OFF OF ROADWAY.
5. DOMESTIC ONLY -- TYLER, EAST JORDAN OR EQUAL.

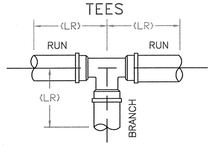
DETAIL NO.		STANDARD DETAIL
W-08		VALVE BOX INSTALLATION DETAIL
SHEET 1 OF 1		

GENERAL NOTES:

1. THE LENGTHS OF RESTRAINT OR CONTINUOUS PIPE CALLED OUT IN THE FOLLOWING TABLES ARE FOR INSTALLATION OF MECHANICALLY RESTRAINT FITTINGS AND ARE CALCULATED BASED ON THE FOLLOWING PARAMETERS:
   - A. THE PIPE MATERIAL IS POLYVINYL CHLORIDE (PVC).
   - B. THE SOIL TYPE IS "ML" AS DEFINED BY THE UNIFIED SOIL CLASSIFICATION, ASTM STANDARD D2487.
   - C. THE SAFETY FACTOR RATIO IS 1.5 TO 1.
   - D. THE TRENCH IS TYPE 5, AS PER ANSI/AWWA C 150/A21.5, TRENCH CONDITIONS.
   - E. THE DEPTH OF COVER IS AS SHOWN ON THE FOLLOWING TABLES.
   - F. THE TEST PRESSURE OF THE WATER SYSTEM IS ONE HUNDRED AND FIFTY POUNDS PER SQUARE INCH (150 PSI).
2. EBAA IRON INC., RESTRAINT LENGTH CALCULATOR (VERSION 5.0.2) PROGRAM WAS USED ALONG WITH THE ABOVE LISTED DESIGN PARAMETERS TO CALCULATE THE LENGTHS SHOWN IN THE TABLES ON THE FOLLOWING SHEETS.
3. CONSERVATIVE ASSUMPTIONS HAVE BEEN MADE IN THE DESIGN OF THE FOLLOWING TABLES. DESIGN ENGINEERS MAY OPT TO PROVIDE THEIR OWN CALCULATIONS PROVIDED THAT THE CALCULATIONS ARE STAMPED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.

DETAIL NO.		STANDARD DETAIL
W-13A		WATER PIPE LENGTH RESTRAINT TABLES DETAIL GENERAL NOTES
SHEET 1 OF 6		

TEES



3' COVER

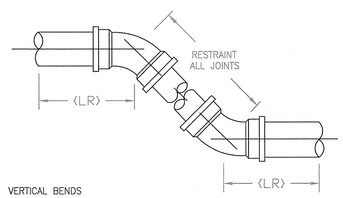
TEE SIZE & PIPE MATERIAL		MINIMUM ATTACHED LENGTH OF PIPE (LR)									
		0'	2'	4'	6'	8'	10'	12'	14'	16'	18'	20'
		LENGTH OF RESTRAINT BRANCH										
PVC	4x4	51'	37'	23'	20'	20'	20'	20'	20'	20'	20'	20'
	6x4	48'	29'	20'	20'	20'	20'	20'	20'	20'	20'	20'
	6x6	71'	57'	43'	30'	20'	20'	20'	20'	20'	20'	20'
	8x4	45'	21'	20'	20'	20'	20'	20'	20'	20'	20'	20'
	8x6	68'	50'	33'	20'	20'	20'	20'	20'	20'	20'	20'
	8x8	93'	79'	65'	51'	37'	23'	20'	20'	20'	20'	20'

4' COVER

TEE SIZE & PIPE MATERIAL		MINIMUM ATTACHED LENGTH OF PIPE (LR)									
		0'	2'	4'	6'	8'	10'	12'	14'	16'	18'	20'
		LENGTH OF RESTRAINT BRANCH										
PVC	12x6	48'	24'	20'	20'	20'	20'	20'	20'	20'	20'	20'
	12x8	67'	47'	27'	20'	20'	20'	20'	20'	20'	20'	20'
	12x12	101'	87'	73'	59'	45'	30'	20'	20'	20'	20'	20'
	16x8	61'	36'	20'	20'	20'	20'	20'	20'	20'	20'	20'
	16x12	95'	77'	59'	41'	22'	20'	20'	20'	20'	20'	20'
	16x16	130'	116'	101'	87'	73'	58'	44'	30'	20'	20'	20'

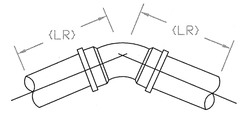
DETAIL NO.		STANDARD DETAIL
W-13B		WATER PIPE LENGTH RESTRAINT TABLES DETAIL TEES
SHEET 2 OF 6		

BENDS



VERTICAL BENDS

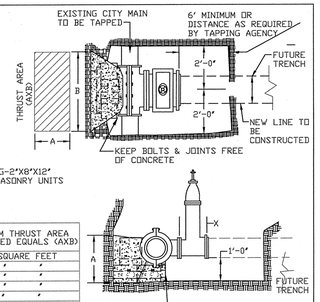
THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON BOTH SIDES OF THE VERTICAL OFFSET SHALL BE DERIVED FROM THE TABLES ON DETAIL NO. W-13E.



HORIZONTAL BENDS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO EXTEND IN BOTH DIRECTIONS FROM THE HORIZONTAL BEND SHALL BE DERIVED FROM THE TABLES ON DETAIL NO. W-13E.

DETAIL NO.		STANDARD DETAIL
W-13C		WATER PIPE LENGTH RESTRAINT TABLES DETAIL BENDS
SHEET 3 OF 6		



SIZE OF PIPE BEING CONNECTED	MINIMUM THRUST AREA REQUIRED EQUALS (AXB)
4" & LESS	3 SQUARE FEET
6"	4 " "
8"	6 " "
10"	9 " "
12"	13 " "
16"	23 " "

NOTES:

1. TAPPING SLEEVE TO BE PLACED A MINIMUM OF 18' FROM ANY BELL COUPLING, VALVE, FITTING, OR OTHER OBSTRUCTION.
2. CONTRACTOR SHALL EXCAVATE AS SHOWN AND SHALL SET TAPPING SLEEVE AND VALVE AND TIGHTEN ALL BOLTS PRIOR TO THE PRESSURE TEST.
3. ALL TAPPING SLEEVES AND VALVES MUST BE PRESSURE TESTED PRIOR TO BLOCKING OR TAPPING. THE TEST MUST BE WITNESSED AND APPROVED BY THE INSPECTOR OR WATER DEPARTMENT.
4. BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND AND BE INSTALLED BEFORE THE TAP IS MADE. ALL FLANGE BOLTS SHALL BE FREE AND CLEAR OF CONCRETE.
5. TAPS SHALL BE MADE BY CITY CREWS AT PREVAILING RATES OR BY APPROVED CONTRACTORS WHEN ALLOWED BY CITY.
6. THIS DETAIL COVERS TAPPING SLEEVES 4" THROUGH 16" IN SIZE ON DUCTILE IRON, C-900 AND ASBESTOS CEMENT PIPE. ANY OTHER SIZE OR TYPE OF PIPE WILL REQUIRE A SEPARATE SUBMITTAL AND APPROVAL BY THE ENGINEER.

DETAIL NO.		STANDARD DETAIL
W-10		TAPPING SLEEVES AND VALVES DETAIL
SHEET 1 OF 1		

BENDS

3' COVER

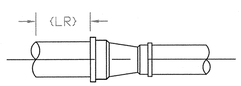
PIPE SIZE & MATERIAL		HORIZONTAL BENDS				VERTICAL BENDS		
		11.25°	22.5°	45°	90°	11.25°	22.5°	45°
PVC	4"	2'	4'	7'	16'	6'	11'	22'
	6"	3'	5'	9'	22'	8'	15'	31'
	8"	3'	6'	12'	29'	10'	20'	40'

4' COVER

PIPE SIZE & MATERIAL		HORIZONTAL BENDS				VERTICAL BENDS		
		11.25°	22.5°	45°	90°	11.25°	22.5°	45°
PVC	12"	3'	7'	12'	31'	11'	21'	44'
	16"	4'	8'	17'	39'	14'	27'	56'

DETAIL NO.		STANDARD DETAIL
W-13D		WATER PIPE LENGTH RESTRAINT TABLES DETAIL BENDS
SHEET 4 OF 6		

REDUCERS



REDUCERS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON THE LARGE SIDE OF THE REDUCER SHALL BE DERIVED FROM THE TABLES BELOW.

3' COVER

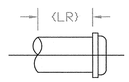
REDUCER SIZE & PIPE MATERIAL		MINIMUM LENGTH RESTRAINT
PVC	6x4	38'
	8x4	70'
	8x6	41'

4' COVER

REDUCER SIZE & PIPE MATERIAL		MINIMUM LENGTH RESTRAINT
PVC	12x4	91'
	12x6	76'
	12x8	56'
	16x6	114'
	16x8	99'
	16x12	58'

DETAIL NO.		STANDARD DETAIL
W-13E		WATER PIPE LENGTH RESTRAINT TABLES DETAIL REDUCERS
SHEET 5 OF 6		

DEAD ENDS



DEAD ENDS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON A DEAD END SHALL BE DERIVED FROM THE TABLES BELOW.

3' COVER

DEAD END SIZE & PIPE MATERIAL		MINIMUM LENGTH RESTRAINT
PVC	4"	53'
	6"	74'
	8"	97'

4' COVER

DEAD END SIZE & PIPE MATERIAL		MINIMUM LENGTH RESTRAINT
PVC	12"	105'
	16"	135'

DETAIL NO.		STANDARD DETAIL
W-13F		WATER PIPE LENGTH RESTRAINT TABLES DETAIL DEAD ENDS
SHEET 6 OF 6		

TETRA TECH
www.tetratech.com
1801 WEST DEUCE OF CLUBS, SUITE 230
SHOW LOW, ARIZONA 85901
PHONE: 928.537.7218 FAX: 928.537.8422

REGISTERED PROFESSIONAL ENGINEER
36630
DOUGLAS LEE BRIMHALL, SR.
Date signed 11/14/11
ARIZONA, U.S.A.
Expires 9/30/13

MARK	DATE	DESCRIPTION	BY

TOWN OF EAGAR
SOUTH BURK STREET, EAGAR, ARIZONA
WATER LINE REPLACEMENT PLAN FOR
SOUTH BURK STREET WATER LINE REPLACEMENT

Project No.:	133-24696-11001
Designed By:	DLB
Drawn By:	RWP
Checked By:	DLB

C-502

Bar Measures 1 inch

11/15/2011 4:49:25 PM - P:\24696\133-24696-11001\CAD\SHEETFILES\C-502-DETAILS.DWG - FLAKE, REED